Kevin G. Donohoe as inventors, and which is now U.S. Patent No. ___ _____, the disclosure of which is incorporated by reference.

At page 7, line 23 before "conducted" insert --is--.

In the Claims:

Cancel claims 8, 9, 14, 15, 29, 43, 51 and 52 without prejudice.

Pending Claims 1-7, 10-13, 16-28, 30-42, 44-50 and 53-57 are presented hereinbelow for the Examiner's benefit.

1. A plasma etching method comprising:

forming a polymer comprising carbon and a halogen over at least some internal surfaces of a plasma etch chamber; and

after forming the polymer, plasma etching using a gas effective to etch polymer from chamber internal surfaces; the gas having a hydrogen component effective to form a gaseous hydrogen halide from halogen liberated from the polymer.

2. The plasma etching method of claim 1 wherein the halogen is selected from the group consisting of fluorine, chlorine and mixtures thereof.

3. The plasma etching method of claim 1 wherein the halogen comprises fluorine.

4. The plasma etching method of claim 1 wherein the gas also comprises an oxygen component.

5. The plasma etching method of claim 1 wherein the gas also comprises O_2.

6. The plasma etching method of claim 1 wherein the hydrogen component comprises NH_3.

7. The plasma etching method of claim 1 wherein the hydrogen component comprises H_2.

10. A plasma etching method comprising:

forming a polymer comprising carbon and a halogen over at least some internal surfaces of a plasma etch chamber; and

after forming the polymer, plasma etching using a gas effective to etch polymer from chamber internal surfaces; the gas comprising a carbon compound effective to getter the halogen from the etched polymer.

11. The plasma etching method of claim 10 wherein the gettering comprises forming a gaseous hydrogen halide from the etched halogen.

12. The plasma etching method of claim 10 wherein the gettering comprises forming a gaseous COA_x compound, where A is the etched halogen.

13. The plasma etching method of claim 10 wherein the carbon compound comprises a hydrocarbon.

16. The plasma etching method of claim 10 wherein the carbon compound comprises a C-O bond.

17. The plasma etching method of claim 10 wherein the carbon compound comprises CO.

18. The plasma etching method of claim 10 wherein the carbon compound comprises CO formed from CO_2 injected into the chamber.

19. The plasma etching method of claim 10 wherein the halogen comprises fluorine.

20. The plasma etching method of claim 10 wherein the gas also comprises an oxygen component.

21. A plasma etching method comprising:

positioning a semiconductor wafer on a wafer receiver within a plasma etch chamber;

first plasma etching material on the semiconductor wafer with a gas comprising carbon and a halogen, a polymer comprising carbon and the halogen forming over at least some internal surfaces of the plasma etch chamber during the first plasma etching; and

after the first plasma etching and with the wafer on the wafer receiver, second plasma etching using a gas effective to etch polymer from chamber internal surfaces and getter halogen liberated from the polymer to restrict further etching of the material on the semiconductor wafer during the second plasma etching.

22. The plasma etching method of claim 21 wherein the receiver is biased during the first plasma etching and provided at ground or floating potential during the second plasma etching.

23. The plasma etching method of claim 21 wherein the gas comprises hydrogen which combines with the halogen during the second plasma etching to form a gaseous hydrogen halide.

24. The plasma etching method of claim 21 wherein the second etching is conducted with a temperature of the receiver provided at from about -10°C to about 40°C and at a chamber pressure of from about 30 mTorr to about 5 Torr.

25. The plasma etching method of claim 21 wherein the halogen comprises fluorine.

26. The plasma etching method of claim 21 wherein the gas comprises an oxygen component.

27. The plasma etching method of claim 21 wherein the gas comprises NH_3, with hydrogen from the NH_3 combining with the halogen during the second plasma etching to form a gaseous hydrogen halide.

28. The plasma etching method of claim 21 wherein the gas comprises H_2 which combines with the halogen during the second plasma etching to form a gaseous hydrogen halide.

30. The plasma etching method of claim 21 wherein the first and second plasma etchings are conducted at subatmospheric pressure, and the wafer remaining *in situ* on the receiver intermediate the first and second etchings, and maintaining the chamber at a subatmospheric pressure at all time intermediate the first and second plasma etchings.

31. The plasma etching method of claim 21 wherein the gettering comprises forming a gaseous COA_x compound, where A is the etched halogen.

32. The plasma etching method of claim 21 wherein the gas comprises a carbon compound effective for the gettering.

33. The plasma etching method of claim 32 wherein the carbon compound comprises a hydrocarbon.

34. The plasma etching method of claim 32 wherein the carbon compound comprises a C-O bond.

35. The plasma etching method of claim 32 wherein the carbon compound comprises CO.

36. A plasma etching method comprising:

positioning a semiconductor wafer on a wafer receiver within a plasma etch chamber, the semiconductor wafer having a photoresist layer formed thereon;

first plasma etching material on the semiconductor wafer through openings formed in the photoresist layer with a gas comprising carbon and a halogen, a polymer comprising carbon and the halogen forming over at least some internal surfaces of the plasma etch chamber during the first plasma etching; and

after the first plasma etching and with the wafer on the wafer receiver, second plasma etching using a gas having one or more components effective to etch photoresist from the substrate and polymer from chamber internal surfaces and getter halogen liberated from the polymer to restrict further etching of the material on the semiconductor wafer during the second plasma etching.

37. The plasma etching method of claim 36 one of the gas components comprises hydrogen which combines with the halogen during the second plasma etching to form a gaseous hydrogen halide.

38. The plasma etching method of claim 36 wherein one of the gas components comprises O_2 and another is hydrogen atom containing.

39. The plasma etching method of claim 36 wherein one of the gas components comprises O_2 and another is hydrogen atom containing, said one component and said another component being provided in the chamber during the second plasma etching at a volumetric ratio of the one to the another of at least 0.1:1.

40. The plasma etching method of claim 36 wherein the halogen comprises fluorine.

41. The plasma etching method of claim 36 wherein one of the gas components comprises NH_3, with hydrogen from the NH_3 combining with the halogen during the second plasma etching to form a gaseous hydrogen halide.

42. The plasma etching method of claim 36 wherein one of the gas components comprises H_2 which combines with the halogen during the second plasma etching to form a gaseous hydrogen halide.

44. The plasma etching method of claim 36 wherein the first and second plasma etchings are conducted at subatmospheric pressure, and the wafer remaining *in situ* on the receiver intermediate the first and second etchings, and maintaining the chamber at a subatmospheric pressure at all time intermediate the first and second plasma etchings.

45. The plasma etching method of claim 36 wherein the gettering comprises forming a gaseous COA_x compound, where A is the etched halogen.

46. The plasma etching method of claim 36 wherein the gas comprises a carbon compound effective for the gettering.

47. A plasma etching method comprising:

positioning a semiconductor wafer on an electrostatic chuck within an inductively coupled plasma etch chamber, the semiconductor wafer having a photoresist layer formed on an insulative oxide layer, the photoresist layer having contact opening patterns formed therethrough;

first plasma etching contact openings within the insulative oxide on the semiconductor wafer through the contact opening patterns formed in the photoresist layer with a gas comprising carbon and fluorine, a polymer comprising carbon and fluorine forming over at least some internal surfaces of the plasma etch chamber during the first plasma etching; and

after the first plasma etching and with the wafer on the electrostatic chuck, providing the electrostatic chuck at ground or floating potential while second plasma etching using a gas comprising an oxygen component and a hydrogen component effective to etch photoresist from the substrate and polymer from chamber internal surfaces, and forming HF during the second plasma etching from fluorine liberated from the polymer to restrict widening of the contact openings formed in the insulative oxide resulting from further etching of the material on the semiconductor wafer during the second plasma etching.

48. The plasma etching method of claim 47 wherein the oxygen comprises O_2.

49. The plasma etching method of claim 47 wherein the hydrogen component comprises NH_3.

50. The plasma etching method of claim 47 wherein the hydrogen component comprises H_2.

53. The plasma etching method of claim 47 wherein the first and second plasma etchings are conducted at subatmospheric pressure, and the wafer remaining *in situ* on the electrostatic chuck intermediate the first and second etchings, and maintaining the chamber at a subatmospheric pressure at all time intermediate the first and second plasma etchings.

54. A plasma etching method comprising:

positioning a semiconductor wafer on an electrostatic chuck within an inductively coupled plasma etch chamber, the semiconductor wafer having a photoresist layer formed on an insulative oxide layer, the photoresist layer having contact opening patterns formed therethrough;

first plasma etching contact openings within the insulative oxide on the semiconductor wafer through the contact opening patterns formed in the photoresist layer with a gas comprising carbon and fluorine, a polymer comprising carbon and fluorine forming over at least some internal surfaces of the plasma etch chamber during the first plasma etching; and

after the first plasma etching and with the wafer on the electrostatic chuck, providing the electrostatic chuck at ground or floating potential while second plasma etching using a gas comprising an oxygen component and a carbon component effective to etch photoresist from the substrate and polymer from chamber internal surfaces, and gettering fluorine liberated from the polymer during the second plasma etching with the carbon component to restrict widening of the contact openings formed in the insulative oxide resulting from further etching of the material on the semiconductor wafer during the second plasma etching.

55. The plasma etching method of claim 54 wherein the gettering comprises forming a gaseous hydrogen halide from the etched halogen.

56. The plasma etching method of claim 54 wherein the gettering comprises forming a gaseous COA_x compound, where A is the etched halogen.

57. The plasma etching method of claim 54 wherein the carbon compound comprises a C-O bond.